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LOW-COST SILICON SOLAR ARRAY PROJECT

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ABSTRACT

The responsibility to conduct ERDA's Low-cost Silicon Solar Array Project, which is a part of the overall Solar Photovoltaics Program, has been delegated to the California Institute of Technology's Jet Propulsion Laboratory (JPL). An Industry Briefing formally announcing this Project was conducted February 5, 1975. The objectives of the Project include a 1985 goal to reduce silicon solar array prices to less than $500/KW. These low-cost arrays further shall have lifetimes greater than 20 years, conversion efficiencies greater than 10% and a national rate of units manufactured greater than 500MW per year. A Project team, led by Robert Forney, has been organized at JPL. This team is divided presently into five major Task areas: Silicon Material, Large Area Silicon Sheet, Module Encapsulation, Automated Array, and Large Scale Production. The Tasks are all part of one integrated effort dedicated to reaching the Project's 1985 objectives. Specifically, the Silicon Material Task is to concentrate on reducing the basic solar cell quality silicon material price to less than $30/Kg with a goal of less than $10/Kg. The Large Area Silicon Sheet Task is to convert the low-cost material into large areas of silicon with the required properties and dimensional thicknesses that will permit their conversion into high efficiency solar cells. The added price goal of this process is less than $1.60/sq. ft. The Encapsulation Task is to produce low-cost, long-life, greater than 20-year lifetime encapsulation materials and techniques. The Automated Array Task is to convert the sheets of silicon into solar arrays utilizing facilities, designs and processes that will result in the less than $500/KW objective. The Large Scale Production Process Task has as its primary objective the supply of silicon solar array modules to ERDA's Photovoltaic Program Demonstration and System Test and Analysis Projects. Approximately 10 megawatts of these modules are presently planned to be procured from Industry with gradually increasing annual buys over the next eight years. It is anticipated these buys will stimulate the market and assist Industry in developing better modules at lower cost. This Large Scale Production Task will benefit from the technology advancement achieved in the previously described four Tasks and could serve as a practical test of improved designs and production techniques. It is a goal that hardware procured through the Large Scale Production Task will be bought for less than $5 per watt by 1979 and $2 per watt by 1983.

This Low-cost Silicon Solar Array Project is to be a National effort involving the best talents in Industry and Universities. Requests for Proposals in the first four Task areas were solicited during April, and proposals are now under evaluation. A Request for Proposals for the first 40 kilowatts of solar array modules required in the Large Scale Production Task will be released in the near future.

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ORGANIZATION

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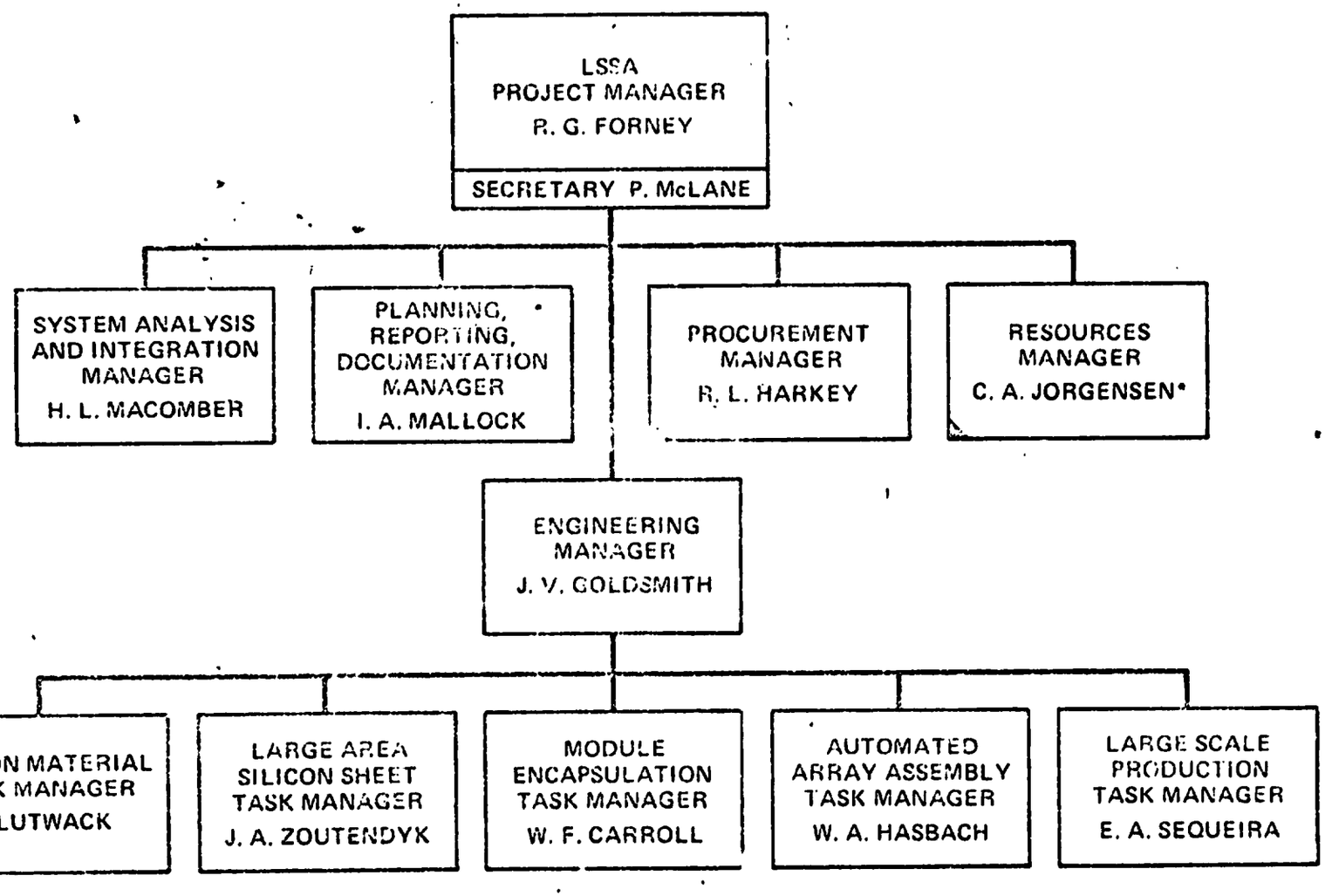

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